

MPA Perspective | Managing Recreational Fishing in MPAs through Vertical Zoning: The Importance of Understanding Benthic-Pelagic Linkages

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Policy-makers and stakeholders increasingly demand that new MPAs have clearly articulated conservation objectives and that user restrictions be demonstrably linked to significant environmental threats. These concerns are often reflected in disputes over whether a proposed MPA must be a no-take reserve to be truly effective, or whether recreational fishing for pelagic species could be permitted without compromising the integrity of the underlying benthic communities — often the primary target of MPA protections.

In such situations, managing recreational fishing through “vertical zoning” that restricts fishing to the MPA’s upper waters might represent a practical way to facilitate existing uses consistent with the site’s primary conservation goals. Clearly, the advisability of this management strategy depends on the scope of the MPA’s conservation objectives (i.e., benthic communities vs. the entire water column), the degree to which its benthic and pelagic communities are linked ecologically and vulnerable to fishing, and the MPA’s ability to monitor and enforce complex fishing restrictions.

To date, the answer to this timely question has been in the eye of the beholder. Without a more transparent scientific basis for evaluating potential threats posed by common activities such as recreational fishing, MPAs will continue to spark opposition from user groups that question their underlying ecological rationale and equitability. In November 2005, the US National Marine Protected Areas Center convened 30 fisheries scientists, marine ecologists, MPA practitioners, and key recreational fishing leaders in Monterey, California, to address this increasingly critical issue. The purpose of this diverse gathering was to synthesize what is currently known about benthic-pelagic (BP) linkages in US marine ecosystems, to identify significant gaps in our scientific understanding of BP linkages, and to lay the preliminary groundwork for practical guidelines and best practices for managing recreational fishing in MPAs.

Benthic-Pelagic Linkages in Marine Ecosystems – General Trends

The workshop participants synthesized current knowledge about the strength, direction and complexity of benthic-pelagic linkages among different taxa and ecosystems. While local BP linkages will differ, three important general trends emerged from the group:

- First, BP linkages can generally be expected to be stronger and more direct in shallow water habitats (i.e., seafloors 50-100m deep); among coastal pelagic fish species (e.g. jacks, mackerel, bluefish); in predictable spawning

aggregations that feed heavily on the benthos; in upwelling zones and other areas of localized biophysical coupling; and in habitats with pronounced three-dimensional relief (e.g., coral reefs, shallow sea mounts, kelp beds).

- Second, BP linkages may be generally weaker and more indirect in deeper habitats where pelagic predators rarely encounter benthic prey and among oceanic pelagic species (e.g., tuna, sharks, marlin).

- Third, there are many circumstances in which ecologically important interactions are likely to be complex, unpredictable, and/or poorly understood. Local ecological factors contributing to complex BP linkages include multiple interactions within and among trophic levels (e.g., with mid-water forage or bait fish); complex behaviors and life histories among key local species; the ephemeral appearance of highly mobile predators; and/or the size of pelagic predator populations.

Thus, while the extreme ends of the BP linkages spectrum are relatively straightforward and intuitive, the vast ecological center is considerably less clear for designers of future MPAs.

Implications of Benthic-Pelagic Linkages for MPA Design

Based on these general ecological trends in the potential occurrence and importance of BP linkages, the workshop participants agreed on some preliminary rules of thumb to help guide MPA planners when evaluating proposals to allow pelagic recreational fishing in an MPA. Vertical zoning of fishing might be appropriate to consider in areas with weak and indirect BP linkages, where pelagic fishing may not impact protected benthic communities. In contrast, vertical zoning might not be an appropriate management design in areas with strong and direct BP linkages, where pelagic fish prey heavily upon benthic or mid-water species. Finally, for the many areas in which the nature, direction, strength, and predictability of the BP linkages are poorly understood, a more precautionary and adaptive approach to MPA design might be most appropriate to adopt, pending additional scientific information about the site.

Next Steps

By identifying the general circumstances in which we may know enough to evaluate the advisability of using vertical zoning of fishing to design and manage benthic-focused MPAs, these scientists, fishermen and managers overcame significant differences in experience and perspective on an important and contentious marine policy issue. Ongoing follow-up actions include developing a more detailed scientific publication, organizing a scientific working group to address the emerging research needs on BP linkages, and working with the recreational fishing community to develop best practices for low impact pelagic fishing by, and for, fishermen. Ultimately, we hope that the workshop’s results, and the subsequent efforts that it has already spawned, will help inform a new direction of science-based collaboration in MPA policy deliberations in the United States and abroad. 

Editor’s note:

The authors of this essay work with the National Marine Protected Areas Center of the USA, established in 2000 to provide science, information, and tools for an effective national system of MPAs (<http://www.mpa.gov>).

Use of Volunteers in MPA Management: Opportunities, Challenges, and Advice

Budgetary shortfalls are a chronic challenge for MPA managers worldwide. It is rare for a MPA to have the funds to pay for all the equipment, material support, and personnel it needs to fulfill its purpose. To meet management goals within financial constraints, the use of volunteers can be invaluable. Many MPAs have set up formal programs to recruit, train, and retain volunteers for a wide array of projects — resource monitoring, enforcement, facility maintenance, and more.

But the management of volunteers can also present challenges, including the time required to train and oversee these personnel, which can be substantial in some cases. This month, *MPA News* examines how several MPA practitioners have set up volunteer programs in diverse sites, and what they have learned from their experiences.

Establishing volunteer programs for a national MPA system

When you visit the website for the Florida Keys National Marine Sanctuary in the USA (<http://www.fknms.nos.noaa.gov>), the homepage offers a link for “Volunteer Opportunities”. Click on that link and you are provided a list of initiatives with needs for volunteer assistance: cleaning reefs, monitoring coral bleaching, testing water quality, restoring conch populations, and more. Information on how to contact each initiative and get involved is readily available.

Mary Enstrom is largely responsible for this. In 1992, she was hired by the sanctuary and by The Nature Conservancy, a NGO, to design and implement a volunteer program for the 9600-km² Florida Keys site. This MPA became the first within the National Marine Sanctuary Program (NMSP) to include a volunteer action plan as a chapter within its management plan. Based on her success in the Florida Keys, Enstrom contracted with NMSP to help develop volunteer management programs for all 13 national marine sanctuaries across the nation, a task completed in 2005. Tools developed for the sanctuaries include a handbook for volunteers, safety manuals, tip sheets for supervisors, and inventories of existing and recommended volunteer projects. Information on each volunteer is entered into

a national database for tracking purposes, and staffers at each site have been trained in volunteer management.

Enstrom says the benefits of recruiting volunteers — and hiring staff to supervise them — are many. “A manager is always able to achieve more once an established volunteer program is up and running,” she says. “Furthermore, operating a volunteer program reduces the cost of monitoring a MPA and reflects to the public that the MPA cares about them and their needs.” It can also lead to funding opportunities, she says. “Governments love to see community involvement and will thus be more likely to provide funding. In addition, citizens who are actively engaged with an organization or government agency will often give more in donations to that group than will those who are not involved.”

Enstrom acknowledges there can be costs as well to managing volunteers, including the time necessary for training and supervision. It is not unusual, she says, for a manager who is already overextended with responsibilities to say that the trouble of adding volunteers would outweigh the benefits. “When a manager says this, I have two responses,” she says. “One, you should not start a volunteer program if you don’t fully support the idea of involving the community in protecting the MPA. Public involvement is a reality for the future of our MPAs. Two, the manager needs to understand how community involvement could help the MPA. In this time of budget constraints, the public can be your best advocates for an adequate budget if they see the value of the site.”

For MPA managers who are considering establishing a volunteer program for their sites, Enstrom advises them to embrace the concept. “Convene a meeting of all agencies and NGOs in your community to discuss the reality of starting a new volunteer program or adding to an existing one,” she says. There are experts out there, she says, to assist in the development. “There are many volunteer program consultants in the world,” she says. “Paying someone to facilitate that meeting for the manager would be worth the cost: an outside consultant is not invested in any of the current programs.” She adds that consultants can also be asked to write an action plan for implementing a MPA volunteer program.

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